

WHAT IS CLAIMED IS:

1. A microwave plasma generator comprising:

a microwave source to generate an excitation microwave;

a discharge gas source;

a plasma generation vacuum vessel to be supplied with a gas from the discharge gas source;

a coaxial waveguide to introduce the excitation microwave into the vessel;

and

a parallel plate launcher in which a resonant cavity is constructed from a first conductor plate connected to an outer conductor of the coaxial waveguide, a dielectric plate, and a second conductor plate connected to a central conductor of the coaxial waveguide and provided with a plurality of openings to emit evanescent microwaves into the vacuum vessel, wherein

the plurality of openings are circular openings,

the space in the coaxial waveguide is isolated from the space in the vessel by an interplanar O-ring disposed between the first conductor plate and the dielectric plate, and

the coaxial waveguide is constructed while being hermetically and slidably supported by the vacuum vessel.

2. The microwave plasma generator according to Claim 1, wherein the coaxial waveguide supports the launcher in the vacuum vessel and is hermetically and slidably coupled to the vacuum vessel, a support device to support a work is disposed at the position facing the second conductor plate of the launcher, and a

relative distance between the support device and the launcher is adjustable.

3. The microwave plasma generator according to Claim 1, wherein the vacuum vessel is a cylindrical vessel, the coaxial waveguide can be moved along the center line of the vessel, and the outline of the first conductor plate of the launcher is slightly smaller than the inner diameter of the vessel.

4. The microwave plasma generator according to Claim 1, wherein a cylindrical portion extending in the direction of the second conductor plate is disposed on the perimeter of the first conductor plate of the launcher, and a microwave emission gap is disposed between the bottom end edge of the cylindrical portion and the perimeter of the second conductor plate.

5. The microwave plasma generator according to Claim 1, wherein an output to pulse-modulate the microwave source is generated by a microwave source driving device, and intermittent driving is effected.